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$$\frac{k[s\sqrt{\beta^2+1}+l-\tfrac{1}{2}a\beta]^3}{3[k^2-\beta^2]^{\frac{3}{2}}}\Bigg\{\pi-\cos^{-1}\left[\frac{s[k+\beta]}{\beta\{s+[(2l-a\beta)/(2\sqrt{1+\beta^2})]\}}-1\right]$$

$$+\left[\frac{s[+\beta]}{\beta\{s+[(2l-a\beta)/(2\sqrt{\beta^2+1})]\}}-1\right]\times$$

$$\sqrt{\frac{s[k+\beta]}{\beta\{s+[(2l-a\beta)/(2\sqrt{\beta^2+1})]\}}\left[2-\frac{s[k+\beta]}{\beta\{s+[(2l-a\beta)/(2\sqrt{\beta^2+1})]\}}\right]}\Bigg\}$$

$$-\frac{a^3k}{24}\Bigg\{\pi-\cos^{-1}\left[\frac{2s\sqrt{\beta^2+1}}{a\beta}-1\right]$$

$$+2\left[\frac{2s\sqrt{\beta^2+1}}{a\beta}-1\right]\sqrt{\frac{s\sqrt{\beta^2+1}}{a\beta}\left[1-\frac{s\sqrt{\beta^2+1}}{a\beta}\right]}=\tfrac{1}{324}\pi c[19a^2+7ab+b^2],$$

which equation contains only s, β, and constants. However, the chance of solving it after differentiation seems extremely slight.

PROBLEMS FOR SOLUTION.

MISCELLANEOUS.

56. Proposed by S. HART WRIGHT, A. M., M. D., Ph. D., Penn Yan, N. Y.

In latitude 40° N.$=\lambda$, when the moon's declination is 5° 23′ N.$=\delta$, and the sun's declination 9° 52′ S.$=-\delta'$, how long after sunset will the cusps of the moon's crescent set synchronously, the moon having recently passed its conjunction with the sun ?

57. Proposed by GEORGE LILLEY, Ph. D., LL. D., Professor of Mathematics in the Oregon State University, Eugene, Oregon.

A particle is placed very near the center of a circle, round the circumference of which n equal repulsive forces are symmetrically arranged ; each force varies inversely as the mth power of its distance from the particle. Show that the resultant force is approximately $\frac{m_1n(m-1)}{2r^{m+1}}\times CP$, and tends to the center of the circle, where m_1 is the mass of the particle, CP its distance from the center of the circle, and r the radius of the circle.

EDITORIALS.

The credit of preparing the index for this volume is due Editor Colow.

Dr. Artemas Martin, of the U. S. Coast and Geodetic Survey, has been promoted to Chief of the Library and Archives Division, at a salary of $1800 per annum, the promotion taking effect July 1, 1897. Dr. Martin has just been elected a member of the "Circolo Matematico di Palermo," Italy.

We regret to announce the death of Prof. B. F. Burleson, which occurred at his home, in Oneida Castle, New York, on December 2. Mr. Burleson was born in Stockbridge, July 7, 1835, but had resided in Oneida Castle for many years, where he was highly esteemed. For a number of years he occupied the position of Principal of the Union School, and in this position he proved a most successful and acceptable teacher. He was extremely fond of mathematics and was very expert in solving difficult problems. For many years he was a frequent contributor to most of the mathematical journals published in this country, and enjoyed a wide acquaintance with well-known mathematical teachers in various parts of the country. Five years ago he was stricken with paralysis and had since suffered from several strokes, which was the final cause of his death. Mr. Burleson was one of those promising but unfortunate men who possessed only the advantages of a common school education. His knowledge of mathematics was obtained by self application and in this way he became a very able analyzer of difficult mathematical problems as his solutions of many difficult problems will show. Had he possessed the advantages of a mathematical course in one of our leading universities, his influence would undoubtedly have been felt in a larger way. All honor is due him for what he made of the opportunities he possessed and the advantages afforded him. There survive him, his widow, a daughter, and one son, George Burleson, of Buffalo, and a sister residing at Oneida Castle.

BOOKS AND PERIODICALS.

Elements of the Differential and Integral Calculus. By William S. Hall, E. M., C. E., M. S., Professor of Technical Mathematics in Lafayette College. 250 pages. Price, $2.25. (1897). New York: D. Van Nostrand.

Great activity has been displayed within the last year in the production of texts on the subject of the Calculus. Among the more recent books on this subject, Professor Hall's treatise is entitled to very favorable consideration. The two branches of the Calculus are treated together to great advantage. The formulas for differentiation are established by the method of limits, but the method of infinitesimals is also explained, and the differential notation used when there is advantage gained by it. The numerical problems illustrating the text and showing applications in engineering practice is an excellent feature of the book. The table of integrals for convenience of reference is more extended than is usual in books of the same scope. Throughout the work there is a great compactness both in the methods and form of treatment, and we find more subjects presented than in most of the elementary texts. The chapter on Differential Equations is one of the best features of the book.